



**ESA Presentation for:**  
**"SPACE STATION EVOLUTION:**  
**BEYOND THE BASELINE"**  
**Conference, League City, Tx 6/7/8 Aug.91**

# **COLUMBUS PROGRAMME**

## **(Current Status)**

*E 6854803 52-18*  
*62383*  
*N 92 - 1PZ 1400*

*PAGE 20* *INTENTIONALLY BLANK*





## COLUMBUS PROGRAMME (current status)

---

### OUTLINE :

- FLASH BACK
- COLUMBUS PROGRAMME DESCRIPTION
- CLOUMBUS PROGRAMME RESTRUCTURING
- LATEST COLUMBUS PROGRAMME STATUS
- COLUMBUS PROGRAMME SCHEDULE



## COLUMBUS PROGRAMME (current status)

---

### FLASH BACK :

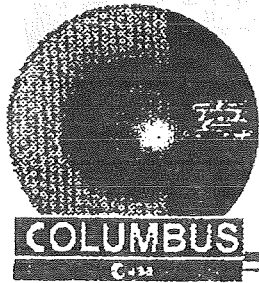
- Europe responded to President Reagan's invitation in Jan.84 to participate in the "International Space Station Program" by proposing a three space element programme called "Columbus"
- Since the MOU with NASA on this programme was signed in September 1988, a number of changes were introduced due to NASA and ESA restructuring activities



## **COLUMBUS PROGRAMME (current status)**

### **PROGRAMME DESCRIPTION:**

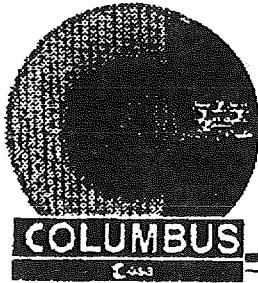
- The Columbus Programme comprises a Space Segment, a Ground Segment, an Operations preparation Programme and a Utilization preparation Programme. A Columbus Exploitation Programme is expected to be initiated in the 1995/1996 time frame.
- The Space Segment consists of three elements:
  - an Attached Pressurized Module (APM) – NSTS launched
  - a Man Tended Free Flyer (MTFF) – ARIANNE5 launched
  - a Polar Platform (PPF) – ARIANNE5 launched



## **COLUMBUS PROGRAMME (current status)**

### **(Programme Description cont'):**

- The Ground Segment is a programme shared with other European Programmes such as Hermes, for communications, services, training and tracking facilities, etc ...
- The Operations preparation Programme focuses on preparing the Ground Segment for readiness for the launch of the Space Segment Elements.
- The Utilization preparation Programme includes definition of candidate payload facilities, initial payload selection and precursor flights (Eureca, Spacelab).



## **COLUMBUS PROGRAMME (current status)**

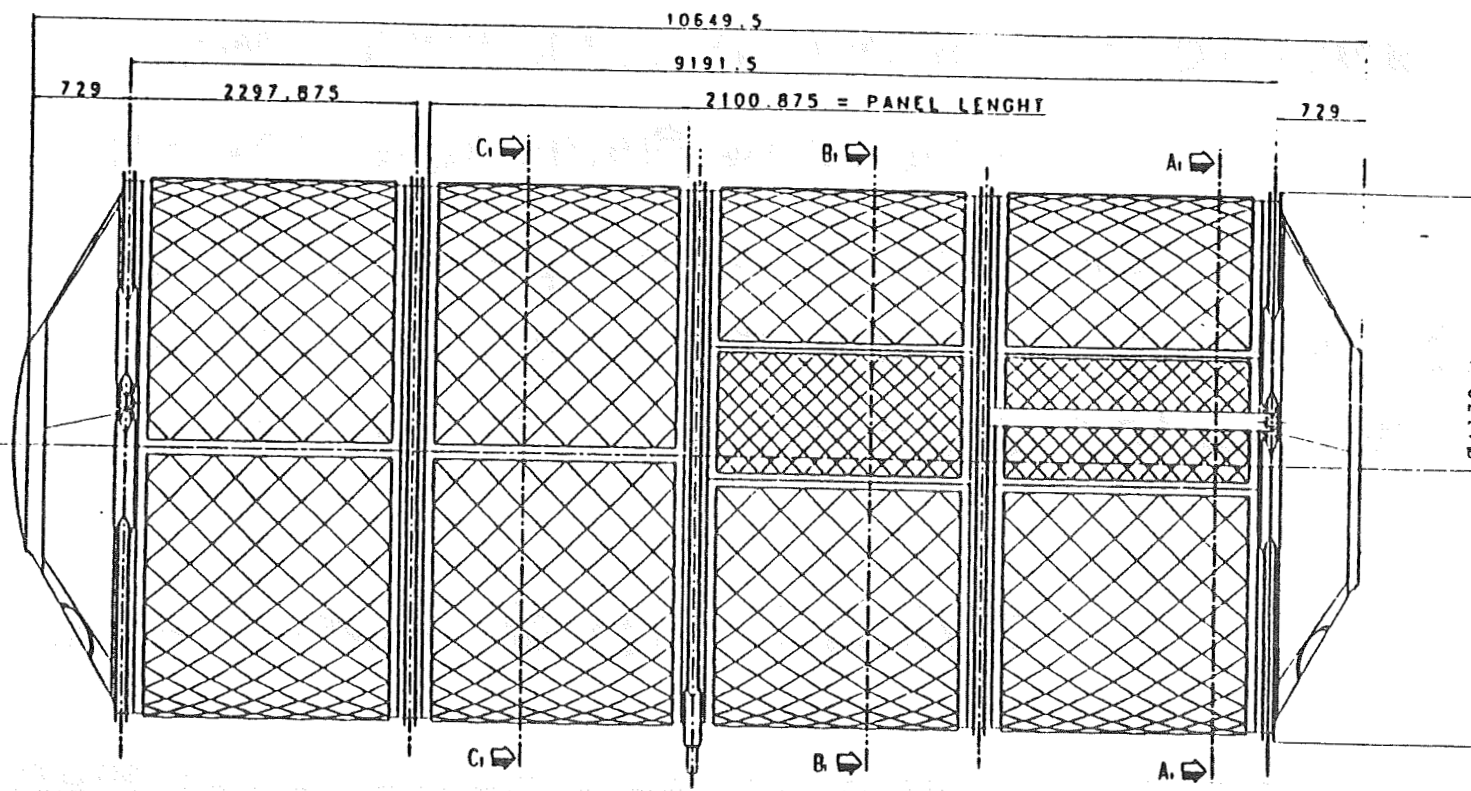
---

### **PROGRAMME RESTRUCTURING:**

- A Restructuring Phase was initiated by the NASA SSF restructuring activities as well as ESA internal schedule adjustments and cost reduction efforts.
- The key restructuring areas are:
  - Down sizing of the APM to an 8 Double Rack equivalent length, including subsystem simplifications. This is consistent with the NASA restructured baseline and schedule;

# COLUMBUS PROGRAMME (current status)

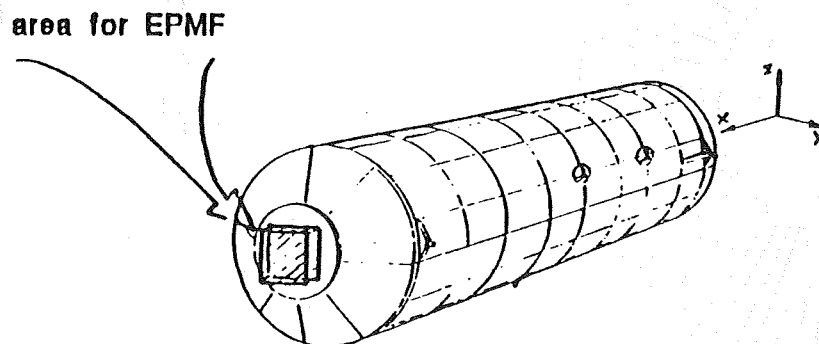
## APM STRUCTURE CONFIGURATION





# COLUMBUS PROGRAMME (current status)

## EXPOSED PAYLOAD MOUNTING FACILITY APM MASS & CoG IMPACTS

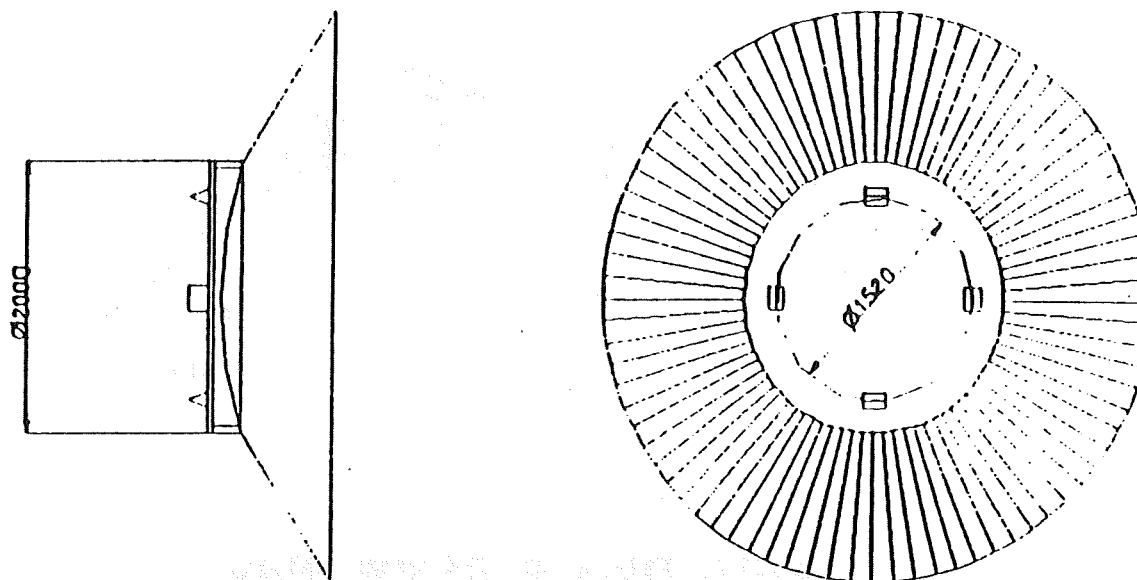


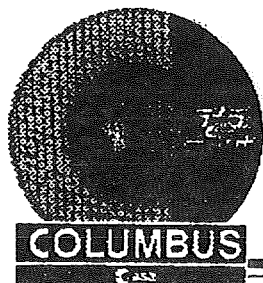
Assuming a Mass of 70 Kg for the EPMF, the variations of the APM Mass and CoG (4,000 Kg of Payload Included) are reported below:

- actual APM Mass = 17,351 Kg / 38,218 lbs (Instead of 17,274 Kg / 38,048 lbs)
- actual APM XCoG = 1,057.9 ° (Instead of 1,059.0 °)
- global Mass (APM and other elements in NSTS cargo bay) = 19,982 Kg = 44,013 lbs
- global XCoG = 1,012.6 °      XCoG - SRD = 17.2 °
- Manager Reserve = 3,287 lbs      XCoG - SRD(with M.R.) = 11.6 °

## EXTERNAL PAYLOAD MOUNTING FACILITY (EPMF)

### EPMF LAY-OUT AND MAIN DIMENSIONS





## **COLUMBUS PROGRAMME (current status)**

### **(Programme Restructuring cont'):**

- The MTFF is no longer dependent on SSF for servicing, but Shuttle servicing is required for backing up the Hermes servicing. The launch date has been delayed to 2001/2002.
- The PPF was essentially not changed during the restructuring activities. Target launch date mid 1998.



## **COLUMBUS PROGRAMME (current status)**

---

### **LATEST PROGRAMME STATUS:**

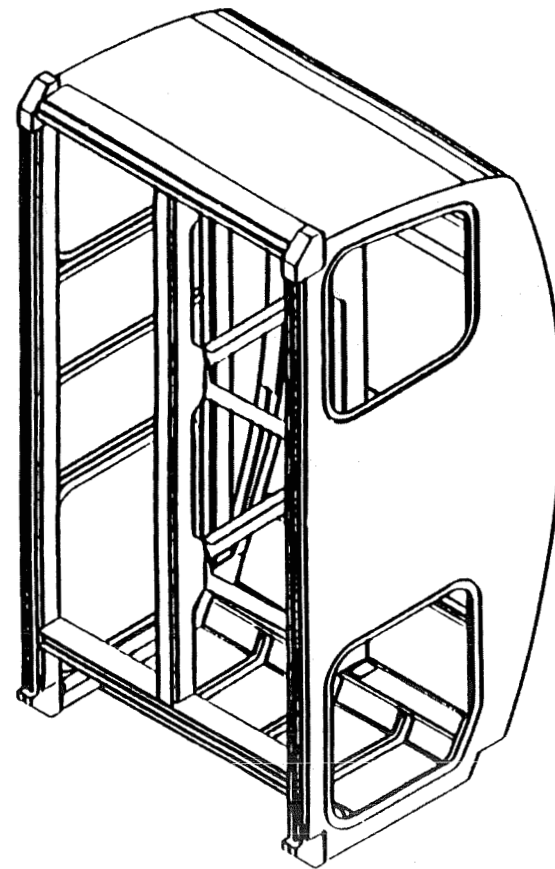
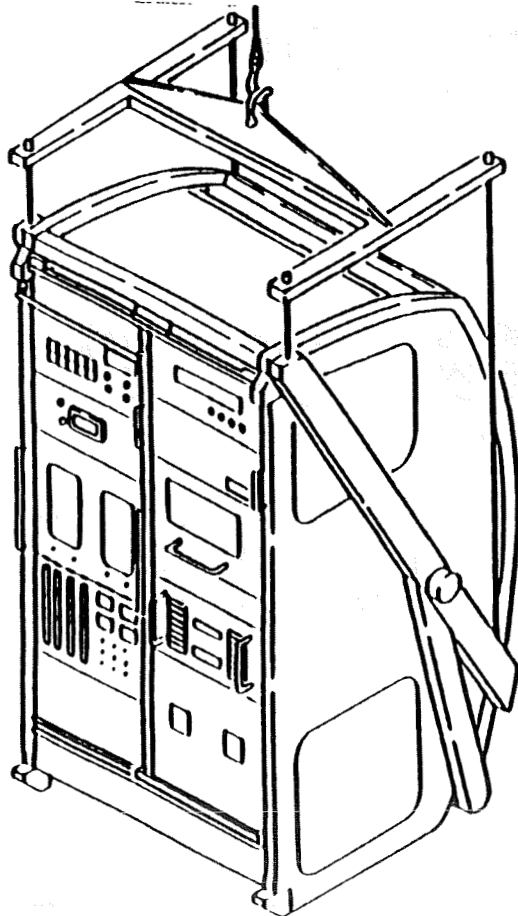
- **TECHNICAL:**

- Achieved agreement with NASA and NASDA for experiment rack interchangeability (20 locations)
- Agreement on essential APM to SSF interface requirements baselined at the SSCB



## COLUMBUS PROGRAMME (current status)

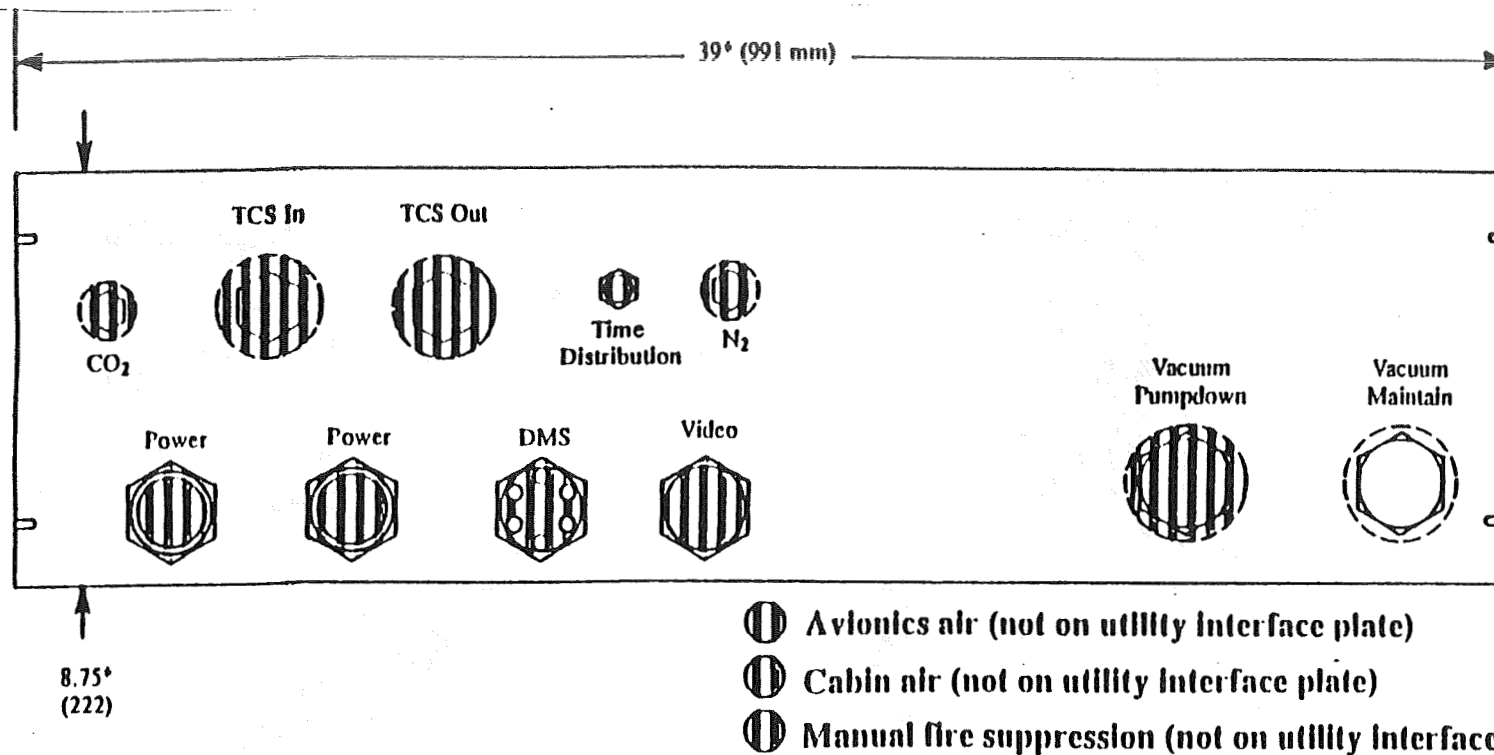
### International Standard Payload Rack (ISPR):



Rack design includes common rack handling sling



# COLUMBUS PROGRAMME (current status)

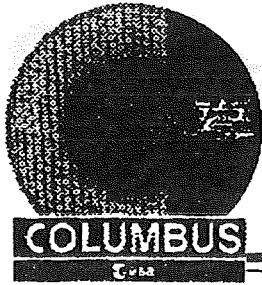


Standard Utility Connections

Every rack has standard utility connections



D.C.Dell/ESA 8/91



## **COLUMBUS PROGRAMME (current status)**

### **(Latest Programme Status cont'):**

- **PROGRAMMATIC:**

- An Updated Industrial Commitment (UIC) received from European Industry which incorporates the restructuring changes as well as a significant cost reduction.
- The APM and PPF baseline are firm, but further optimization of the MTFF baseline will be pursued, as the relaxed schedule can now easily accommodate this.



## **COLUMBUS PROGRAMME (current status)**

---

### **CONCLUSION**

- **Current Columbus Programme status in line with NASA restructured Station (configuration and schedule)**
- **Current Columbus Programme status also in line with european intermediate and long term objectives**
- **Long term plan includes participation in SSF Programme, gradual evolution to autonomy in space and cooperation in future large scale space programs such as mission to the Moon or Mars, etc...**





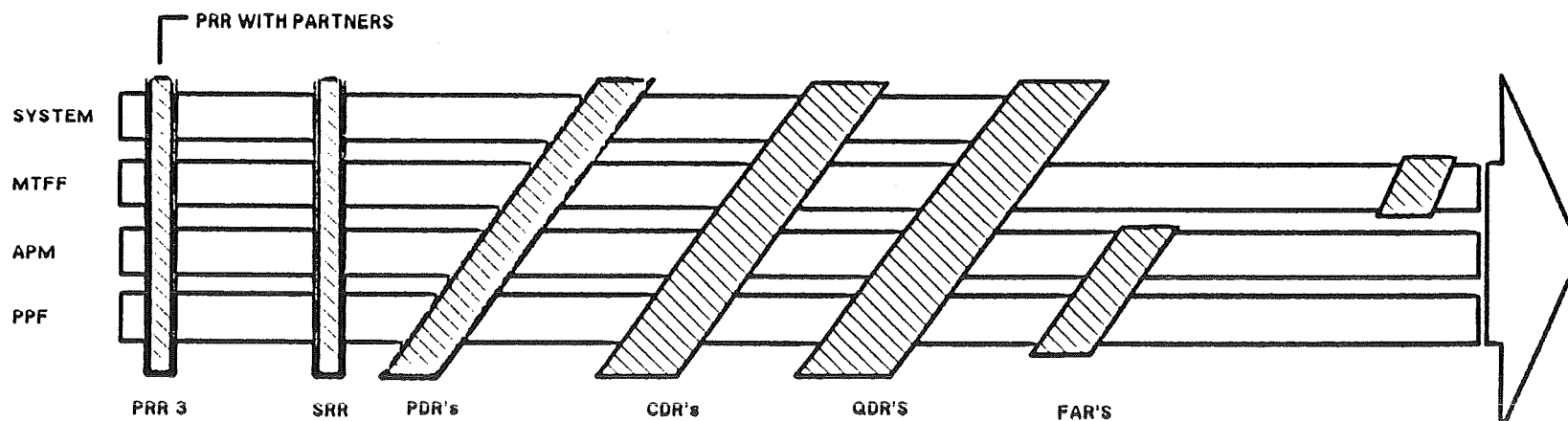
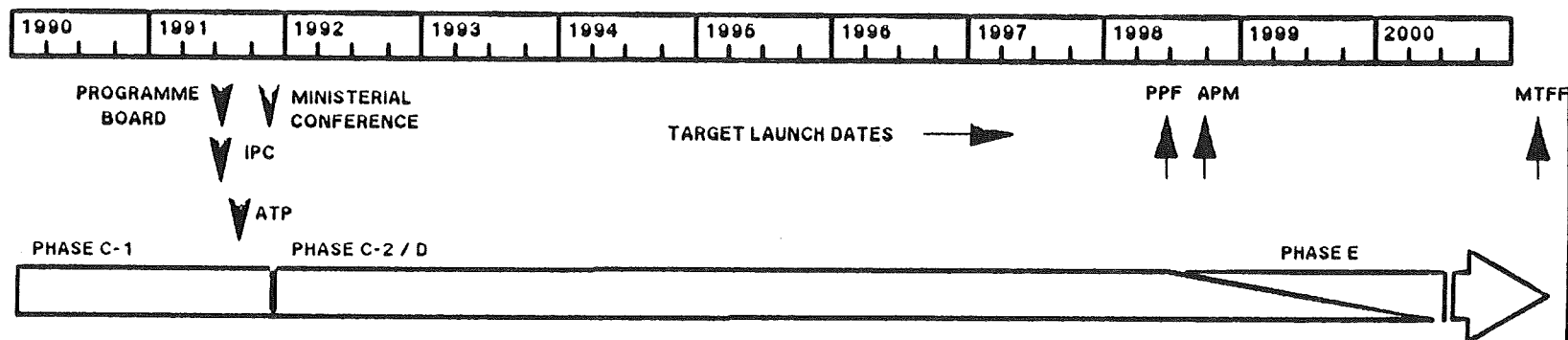
# SSFPO MONTHLY STATUS REVIEW

LEAGUE CITY, TX -- 6 AUGUST 1991

ESA  
COLUMBUS  
LIAISON  
OFFICE

## COLUMBUS SPACE SEGMENT - OVERALL PLANNING

STATUS: AUGUST 1991



(TOP&CHD11)  
66P010/P

ESA - 6

NOTE: ALL PHASE C/D/E DATES PROVISIONAL